REMARKS

Applicants thank the Examiner for the thorough consideration given the present application. Claims 1-11, 14-24 and 26-36 are currently being prosecuted. The Examiner is respectfully requested to reconsider his rejections in view of the amendment and remarks as set forth below.

Rejection Under 35 USC 112

Claims 26-36 stand rejected under 35 USC 112, second paragraph as being indefinite. The Examiner stated that the limitation in line 6 was unclear as to which element is being embedded. By way of the present Amendment, Applicants have amended the language of this line in order to make it more clear. It is also pointed that this limitation does not refer to Figure 1 as suggested by the Examiner, but rather to Figure 3 as described in lines 1-8 of the first paragraph at the top of page 6. As indicated there, the inorganic substrate 10 is covered by the covering layer 40. In view of this, Applicants submit that this rejection is overcome.

Rejection Under 35 USC 103

Claims 1-5, 7-11, 14-18, 20-24, 26-30 and 32-36 stand rejected under 35 USC 103 as being obvious over Berger et al. (US Patent 6,528,145) in view of Nishide et al. (US Patent 5,827,605), Zak (US Patent 6,006,427) and Hashemi (US Patent 6,867,493). This rejection is respectfully traversed.

The Examiner states that Berger et al. teaches an inorganic substrate 20 with wiring 26 and two substrates with printed circuit boards integrated with the inorganic substrate. The Examiner admits that Berger et al. does not teach that the printed circuit boards can be organic nor having a passive component formed in/on the inorganic substrate nor the bonding layer having vias formed therein for bonding the organic substrate and the printed circuit board.

The Examiner relies on Nishide et al. to teach an inorganic substrate 1, 2 having a passive component 4, 5, 8 formed thereon. The Examiner relies on Zak to teach that printed circuit boards can be organic. The Examiner newly relies on Hashemi et al. to show a bonding layer having vias formed thereon for bonding a substrate 820 and a printed circuit 898. The

Examiner feels that it would have been obvious to use the organic printed circuit boards and at least a passive component formed on the inorganic substrate in the Berger et al. device such that two organic substrates located on two sides of the inorganic substrate having connections between ports and the passive component of the inorganic substrate through the organic substrate and at least one bonding layer having vias for bonding the inorganic substrate and the printed circuit board. The Examiner has indicated the motivation is to reduce the cost of making the device, to make the device more compact and to provide a more solid connection.

Applicants submit that the present claims are not obvious over this four way combination of references. First, Applicants submit that the Examiner's statement of motivation is insufficient That is, one skilled in the art would not look to these four different references to combine individual features. Even if the cost of making the device would be reduced and the device would be more compact, this is not sufficient motivation for one skilled in the art to look to other references to change the Berger et al. device without some need to do so. It appears that the Examiner has reengineered the present claimed invention in hindsight after viewing the application by assembling different features from four different references without any indication as to why they should be put together. Accordingly, Applicants submit that it would not be obvious to one of ordinary skill in the art to combine the four references nor that one skilled in the art would be motivated to make such a combination.

Further, Applicants disagree with the Examiner's understanding of the Berger et al. reference. The composite substrate of Berger et al. has ceramic layers 22 with porosity 28. Polymeric material seals the outside of the composite substrate and only partially infiltrates into it, thereby leaving most of porosity 28 free of polymeric material 32. Polymeric material is not deposited in areas 34 so that an electrical connection can be made to a semiconductor device or a printed circuit board.

In regard to independent claims 1 and 14, the Examiner feels that the bonding layer is shown as the BGA layer. In the claims, the bonding layer is provided between the inorganic substrate and the organic substrate for bonding the two. In Berger et al., the composite substrate is ready for semiconductor device joining and interconnection. Semiconductor joining can use conventional area array interconnections with or without underfill. The connections to the PCB

can made using conventional surface mount technologies such as ball grid arrays, land grid arrays or plugable interconnections. Applicants submit that the bonding layer of the present application is different from the BGA of Berger al. In the present invention, the bonding layer only provides bonding between two substrates of different materials and does not provide electrical interconnection between two substrates. The electrical connection is connected by via holes, buried holes or blind holes. The BGA of Berger et al. provides an electrical between substrates and components. Applicants submit that the BGA technology is not suitable for bonding of organic or inorganic substrates due to the degradation of the ball grid array by room temperature aging.

In regard to claim 26, the claim states that the inorganic substrate 10 is covered by a covering layer 40. The inorganic substrate is covered by the covering layer and bonded with the two organic substrates 20 such that the inorganic substrate is integrated with the organic substrates. Applicants submit that the top layer of Berger et al.'s substrate 22 cannot be considered as a covering layer. If the top layer is considered as a covering layer, the inorganic substrate is not shown. Applicants submit that a covering layer which integrates with the organic substrate such that inorganic substrate is sandwiched between the organic substrates is not taught by Berger et al. Further, Applicants submit that BGA cannot be a covering layer since individual points are present on the surface but do not "cover" the entire surface.

Further, claims 1 and 14 are allowable since these claims also recite the vias that are formed in the bonding layer. Applicants submit that Berger et al. does not teach this arrangement.

Also, it is noted that Berger et al. shows a composite substrate. This differs from the present invention which provides a composite laminate and at least an inorganic substrate and an organic substrate. The composite laminate is applicable for integrated and minimized electronic circuits. Applicants submit that the substrate of the present invention is different from that of Berger et al. since the present invention discloses a composite laminate including at least an inorganic substrate and an organic substrate.

The Examiner has relied on Nishide et al. to show an inorganic substrate with a passive component. The Examiner relies on Zak to show the advantages of an organic printed circuit board. The Examiner relies on Hashemi et al to show the vias. Applicants submit that the even if these references are combined they do not teach the present claimed invention since it is not clear how these various pieces could be put together into a single device in a workable fashion. Accordingly, Applicants submit that independent claims 1, 14 and 26 are allowable.

Claims 2-11, 15-24 and 27-36 depend from these allowable independent claims and as such are also considered to be allowable. In addition, each of these claims recite other features that make them additionally allowable.

Claims 6, 19 and 31 stand rejected under 35 USC 103 as being obvious over the four way combination described above and further in view of Czjakowski et al. (US Patent 6,613,978). This rejection is respectfully traversed.

The Examiner cites the Czjakowski et al. reference to teach a plurality of printed circuit boards formed on a ceramic substrate. However, Applicants submit that even if this reference does teach this feature, these claims remain allowable based on their dependence from allowable independent claims. Furthermore, Applicants submit that this five way combination of references is even less obvious to one in the ordinary skill in the art. Accordingly, Applicants submit that this rejection is likewise overcome.

Conclusion

In view remarks, it is believe that claims clearly distinguish over the patents relied on by the Examiner, either alone or in combination. In view of this, reconsideration of the rejection and allowance of all the claims are respectfully requested.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Robert F. Gnuse Reg. No. 27,295 at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.14; particularly, extension of time fees.

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Respectfully submitted,

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